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# Class 10 Mathematics: TRIANGLES

**Source: CBSE Previous Year Questions (PYQs) | Total Questions: 26**

## Section A: Multiple Choice Questions (1 Mark Each)

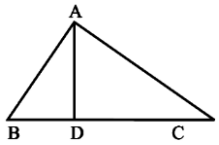
1. In $\triangle ABC, DE \| BC$, where $D$ and $E$ are points on sides $AB$ and $AC$ respectively. If $AD = 2$ cm, $BD = 3$ cm, and $AE = 3.5$ cm, then the length of $AC$ is:

   (a) 5.25 cm (b) 8.75 cm (c) 5 cm (d) 4.5 cm (CBSE 2020)

2. In Figure, $\angle BAC = 90°$ and $AD \perp BC$. Then:

   (a) $BD \cdot CD = BC^2$ (b) $AB \cdot AC = BC^2$ (c) $BD \cdot CD = AD^2$ (d) $AB \cdot AC = AD^2$

   (CBSE 2011, 2023- Standard)




3. A vertical pole of length 6 m casts a shadow 4 m long on the ground and at the same time a tower casts a shadow 28 m long. The height of the tower is:

   (a) 42 m (b) 48 m (c) 54 m (d) 24 m (CBSE 2017, 2020)

4. In $\triangle ABC$, $D$ and $E$ are points on side $AB$ and $AC$ respectively such that $DE \| BC$. If $AD = x, DB = x - 2, AE = x + 2$ and $EC = x - 1$, then the value of $x$ is:

   (a) 4 (b) 2 (c) 1 (d) 8 (CBSE 2018)

5. It is given that $\triangle ABC \sim \triangle DFE, \angle A = 30°, \angle C = 50°, AB = 5$ cm, $AC = 8$ cm and $DF = 7.5$ cm. Then, the following is true:

   (a) $DE = 12$ cm, $\angle F = 50°$ (b) $DE = 12$ cm, $\angle F = 100°$ (c) $EF = 12$ cm, $\angle D = 100°$

   (d) $EF = 12$ cm, $\angle D = 30°$ (NCERT Exemplar / CBSE PYQ)

6. If in two triangles $\triangle DEF$ and $\triangle PQR, \angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true?

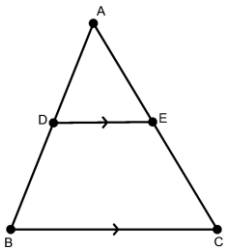
   (a) $\frac{EF}{PR} = \frac{DF}{PQ}$ (b) $\frac{DE}{PQ} = \frac{FF}{RP}$ (c) $\frac{DE}{QR} = \frac{DF}{FQ}$ (d) $\frac{EF}{RP} = \frac{DE}{QR}$

   (CBSE 2019)



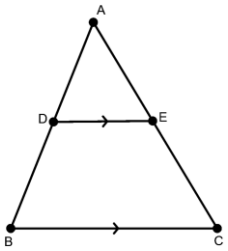
## Section B: Very Short Answer Questions (2 Marks)

7. In Figure, $DE \| BC$. If $AD = 1.5$ cm, $BD = 2AD$, then find the ratio $\frac{\text{area } (\triangle ADE)}{\text{area ( trapezium } DBCE)}$.

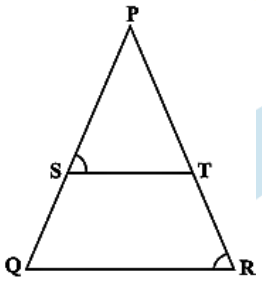



OR

In Figure, $DE \| BC$. If $\frac{AD}{DB} = \frac{3}{5}$ and $AC = 4.8$ cm, find the length of $AE$. **(CBSE 2014, 2017)**



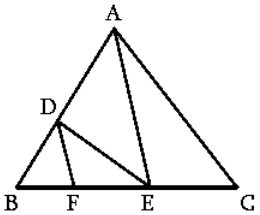

8. Diagonals $AC$ and $BD$ of a trapezium $ABCD$ with $AB||DC$ intersect each other at the point $O$. Using a similarity criterion for two triangles, show that $\frac{OA}{OC} = \frac{OB}{OD}$. **(CBSE 2019, 2022)**
9. $E$ is a point on the side $AD$ produced of a parallelogram $ABCD$ and $BE$ intersects $CD$ at $F$. Show that $\triangle ABE \sim \triangle CFB$. **(CBSE 2013, 2016)**
10. In the given figure, if $\frac{PS}{SQ} = \frac{PT}{TR}$ and $\angle PST = \angle PRQ$. Prove that $\triangle PQR$ is an isosceles triangle. **(CBSE 2015)**



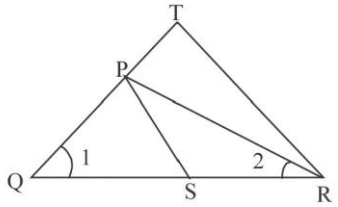

11. Altitudes $AD$ and $CE$ of $\triangle ABC$ intersect each other at the point $P$. Show that $\triangle ABD \sim \triangle CBE$. **(CBSE 2018)**
12. $ABCD$ is a trapezium in which $AB||DC$ and its diagonals intersect each other at the point $O$. Show that $\frac{AO}{BO} = \frac{CO}{DO}$. **(CBSE 2012)**

## Section C: Short Answer Questions (3 Marks)

13. In the given figure, $DE||AC$ and $DF||AE$. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$. **(CBSE 2020 - Basic Proportionality Theorem)**



14. State and prove the Basic Proportionality Theorem (Thales Theorem) . **(CBSE 2018, 2020, 2023 - Repeatedly Asked Theorem)**
15. In Figure, $\frac{QR}{QS} = \frac{QT}{PR}$ and $\angle 1 = \angle 2$. Show that $\triangle PQS \sim \triangle TQR$. **(CBSE 2013, 2017)**

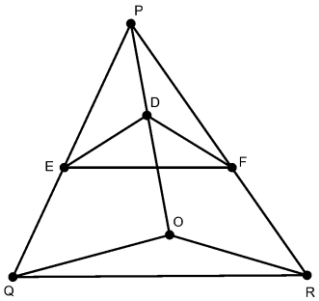



16. A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground, find the length of her sha dow after 4 seconds. **(CBSE 2012, 2020)**

17. Through the mid-point $M$ of the side $CD$ of a parallelogram $ABCD$, the line $BM$ is drawn intersecting $AC$ in $L$ and $AD$ produced in $E$. Prove that $EL = 2BL$. (CBSE 2011 **Very Important**)
18. Two right triangles $ABC$ and $DBC$ are drawn on the same hypotenuse $BC$ and on the same side of $BC$. If $AC$ and $BD$ intersect at $P$, prove that $AP \times PC = BP \times PD$. **(CBSE 2015, 2019)**
19. In $\triangle ABC$, $AD$ is a median and $E$ is the mid-point of $AD$. $BE$ produced meets $AC$ at $F$. Prove that $AF = \frac{1}{3}AC$. **(CBSE 2016 Important)**

## Section D: Long Answer Questions (5 Marks)

20. If a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, then prove that the other two sides are divided in the same ratio. Using the above, solve: In $\triangle ABC$, $DE \| BC$ and $AD = 4$ cm, $DB = 5$ cm, $AE = 6$ cm. Find $AC$. **(CBSE 2016, 2019)**
21. Prove that if a line divides any two sides of a triangle in the same ratio, then the line is parallel to the third side. In figure, $DE \| OQ$ and $DF \| OR$. Show that $EF \| QR$. **(CBSE 2015, 2022)**




22. Sides $AB$ and $AC$ and median $AD$ of a triangle $ABC$ are respectively proportional to sides $PQ$ and $PR$ and median $PM$ of another triangle $PQR$. Show that $\triangle ABC \sim \triangle PQR$. **(CBSE 2012, 2017, 2023 - Very Important)**

**23.** $CM$ and $RN$ are respectively the medians of $\triangle ABC$ and $\triangle PQR$. If $\triangle ABC \sim \triangle PQR$, prove that: (i) $\triangle AMC \sim \triangle PNR$ (ii) $\frac{CM}{RN} = \frac{AB}{PQ}$ (iii) $\triangle CMB \sim \triangle RNQ$ **(CBSE 2019, 2023)**

**24.** $CM$ and $RN$ are respectively the medians of $\triangle ABC$ and $\triangle PQR$. If $\triangle ABC \sim \triangle PQR$, prove that: (i) $\triangle AMC \sim \triangle PNR$ (ii) $\frac{CM}{RN} = \frac{AB}{PQ}$ (iii) $\triangle CMB \sim \triangle RNQ$ **(CBSE 2019, 2023)**

## Section E: Case Study Based Questions (4 Marks)

25. **Case Study 1:** The Kite Festival On the occasion of Makar Sankranti, Rohan and Sohan are flying kites. Rohan's kite is flying at a certain height from the ground. At a particular instant, the kite, the hand holding the string, and the shadow of the kite on the ground form a triangle.

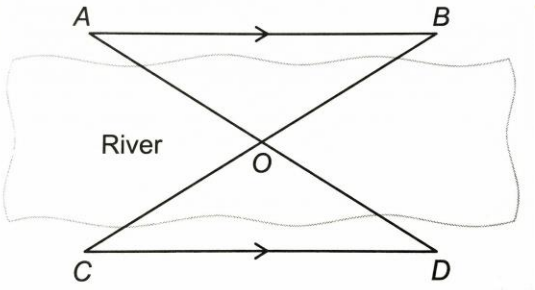
- Situation: A vertical stick of length 15 cm casts a shadow 12 cm long on the ground. At the same time, a tower casts a shadow 40 m long on the ground.

(i) Which mathematical concept is used here? ( 1 Mark)

(ii) Check if the triangle formed by the stick and its shadow is similar to the triangle formed by the tower and its shadow. (1 Mark)

**(iii)** Find the height of the tower. (2 Marks) **(CBSE Question Bank / Modified PYQ Concept)**

26. **Case Study 2:** GPS Mapping Vijay is trying to find the distance between two points $A$ and $B$ on opposite sides of a river. He locates a point $C$ on the bank such that angle $C$ is not 90°. He moves to a point $D$ such that $CD = 30$ m and finds that the line joining $D$ and $A$ passes through a point $O$. He measures $OD$ and $OA$ and finds their ratio.




(i) Which similarity criterion is applicable for $\triangle OAB$ and $\triangle OCD$ ? (1 Mark)

(ii) If $OA = 50$ m, $OB = 40$ m, $OD = 10$ m, find $OC$. ( 2 Marks)

**(iii)** If the distance $AB = 100$ m, find the distance $DC$. (1 Mark) **(CBSE Sample Paper / 2022 Board Pattern)**